

**AMENDMENT OF DESCRIPTION IN CLEAN FORM**

H  
1

Two broad categories of pulp manufacturing techniques are known in the art. The first technique is known as the digestion process, wherein lignocellulose fiber containing material (wood chips) are treated with chemicals and heat in order to break down the structure of the wood chips and produce pulp suitable for use in the paper making process. A second technique for producing pulp, known as the mechanical pulping process, involves passing lignocellulose fiber containing material, such as wood chips, through an attrition device where the fibers of the wood chips are mechanically separated. Variations of the mechanical pulping process are also known and include the thermo-mechanical pulping process ("TMP"). In the TMP process, wood chips are fed into a pressurized pre-heater, treated with steam and are subsequently ground into pulp. U.S. Patent Application No. 08/736,366, filed October 23, 1996, "Low-Resident, High-Temperature, High Speed Chip Refining", (now U.S. Pat. No. 5,776,305) discloses a further variation on the ground wood pulp process, whereby the wood chips are held at a temperature greater than the glass transition temperature ( $T_g$ ) of the lignin in the wood chips for a period of time preferably less than 30 seconds, then immediately refined in a high speed disc refiner. According to the application, the wood chips are preferably subjected to a preheat environment of saturated steam at an elevated pressure in the range of 75-95 psi. (All values of pressure expressed as psi throughout this Specification including claims, refer to pounds per square inch gage pressure, i.e., psig). The assignee of the 08/736,366 application identifies the system and associated process as the "RTS".

**ALL PENDING CLAIMS (INCLUDING THE PRESENT AMENDMENT)  
IN CLEAN FORM**

- H2
2. The method as claimed in claim 31, wherein said compression is

ANDR/346/US

6

H2  
performed in a compression screw device in a range of from 4:1 to 8:1 of the non-compressed volume of said conditioned feed material.

---

H3  
7. The method as claimed in claim 2, wherein said conditioning of said feed material is performed for a period of time in the range of 3-180 seconds.

---

23. The method of claim 31, wherein the step of preheating is preceded by the steps of

discharging the destructured material into a conveyer at substantially atmospheric pressure;

conveying the discharged material into a storage bin at substantially atmospheric pressure; and

H4  
conveying material from the bin by a plug screw feeder through a pressure barrier into a higher pressure environment where said step of preheating is performed.

24. The method of claim 36, wherein the step of preheating is preceded by the steps of

discharging the destructured material into a conveyer at substantially atmospheric pressure;

conveying the discharged material into a storage bin at substantially atmospheric pressure; and

conveying material from the bin by a plug screw feeder through a pressure barrier into the higher pressure environment where said step of preheating is performed.

25. The method of claim 31, wherein the steps of conditioning and compressing are both performed in a substantially similar environment of saturated steam.

H4  
26. The method of claim 31, wherein said saturated steam environment for conditioning and compression is at a saturated pressure corresponding to a temperature no greater than about 120° C and the steps of preheating and conveying the destructured material are performed at a saturated pressure corresponding to a temperature greater than about 120° C.

27. The method of claim 26, wherein the conditioning of said feed material is performed for a period of time in the range of 3-60 seconds.

29. A method for producing thermo-mechanical pulp from lignocellulose fiber-containing chip feed material comprising the steps of:

H5  
first conditioning said fiber containing feed material in an environment of saturated steam at a pressure in the range of about 15-25 psig to produce a conditioned feed material;

subsequently compressing said conditioned feed material in a screw press in an environment of saturated steam at a pressure in the range of about 15-25 psig at a compression ratio of at least about 4:1 to destructure said fibers;

subsequent to the step of compressing, preheating the destructured material in an environment of saturated steam; and

immediately following the step of preheating, refining said material to form lignocellulose pulp.

H6  
31. A method for producing thermo-mechanical pulp in a primary disc refiner from lignocellulose fiber-containing chip feed material comprising the steps of:

first conditioning said fiber-containing feed material in an environment of saturated steam at an elevated pressure in the range of about 15-25 psig to produce a conditioned feed material;

directly thereafter compressing said conditioned feed material in an environment

of saturated steam at an elevated pressure in the range of about 15-25 psig to destructure said fibers without significant breakage across grain boundaries;

pre-heating the destructed material in an environment of saturated steam at a pressure higher than the pressure of the environment at which the material was destructured; and

conveying the pre-heated material to the inlet of a primary disc refiner operating at a higher pressure than the pressure of the environment at which the material was destructured.

32. The method of claim 27, wherein said compression is performed in a compression screw device in the range of from 4:1 to 8:1 of the non compressed volume of said conditioned feed material.

33. The method of claim 31, wherein the conditioning of said feed material is performed for a period of time in the range of 3-60 seconds.

34. The method of claim 31, wherein said step of compressing said conditioned feed material is performed in a variable speed compression screw device in the range of from 4:1 to 8:1 of the non compressed volume of said conditioned feed material.

35. The method of claim 34, wherein the conditioning of said feed material is performed for a period of time in the range of 3-30 seconds.

36. A method for producing thermo-mechanical pulp in a primary disc refiner from lignocellulose fiber-containing chip feed material comprising the steps of:

first conditioning said fiber containing feed material while conveyed through a first chamber having an environment of saturated steam at an elevated pressure in the range

of about 10-25 psig to produce conditioned feed material;

conveying and compressing the conditioned feed material through a second chamber having an environment of saturated steam at elevated pressure in the range of about 10-25 psig to produce a pretreated material having destructured fibers without significant breakage across grain boundaries;

preheating the pretreated material in a third chamber in an environment of saturated steam at a pressure above 75 psig and above the glass transition temperature of the lignin in the material, for a period of time less than 30 seconds;

conveying the pre-heated material to the inlet of a primary disc refiner operating at a pressure above 75 psig and a temperature above the glass transition temperature of the lignin; and

refining the material at a disc speed of rotation that is greater than 1500 rpm for a double disc refiner or greater than 1800 rpm for a single disc refiner.

37. The method of claim 36, wherein the conditioning of said feed material is performed for a period of time in the range of 3-60 seconds.

---

38. The method of claim 37, wherein the preheat time period is in the range of about 5-10 seconds.

---

39. The method of claim 36, wherein the preheat time period is 15 seconds or less.

40. The method of claim 39, wherein the conditioning of said feed material is performed for a period of time in the range of 3-60 seconds.

---